Electrical, Electronic, and Mechanical Drafters

Table of Contents *(scroll or use links below to navigate document)*

What They Do

Drafters prepare technical drawings and plans used by production and construction workers to build everything from manufactured products, such as toys, toasters, industrial machinery, or spacecraft, to structures such as houses, office buildings, or oil and gas pipelines. Their drawings provide visual guidelines, showing the technical details of the products and structures and specifying dimensions, materials to be used, and procedures and processes to be followed. Drafters fill in the details, using drawings, rough sketches, specifications, codes, and calculations previously made by engineers, surveyors, architects, or scientists.

Electrical Drafters make wiring diagrams and schematics of electrical circuits for use by those who install and repair electrical systems such as those found in buildings, communication centers, and power plants. Most Electrical Drafters use computer-aided drafting (CAD) systems to prepare drawings.

Electronic Drafters make drawings of the layout and schematics of electronic devices and components. They may specialize in the drafting of drawings used to make one or several related types of devices or components or they may be involved with many kinds of electronic items. Most Electronic Drafters use CAD systems to prepare drawings.

Mechanical Drafters use CAD systems to prepare drawings. These systems permit them to easily and quickly prepare variations of a design. They use their knowledge of engineering and manufacturing theory and standards to draw the parts of a machine in order to determine design elements, such as the number and kind of fasteners needed to assemble it. Despite the near-universal use of CAD systems, manual drafting using pencils, pens, compasses, protractors, triangles, and other drafting devices is still used in certain applications.

Tasks

Electrical Drafters

- Study work order requests to determine type of service demanded, such as lighting or power.
- Visit proposed installation sites and draw rough sketches of location.
- Assemble documentation packages and produce drawing sets which are then checked by an engineer or an architect.
- Confer with engineering staff and other personnel to resolve problems.
- Draft working drawings, wiring diagrams, wiring connection specifications or cross-sections of underground cables, as required for instructions to installation crew.

EDD Employment Development Department State of California
LMID Labor Market Information Division "Your Information Source"

Electrical, Electronic, and Mechanical Drafters

- Draw master sketches to scale showing relation of proposed installations to existing facilities and exact specifications and dimensions.
- Measure factors that affect installation and arrangement of equipment, such as distances to be spanned by wire and cable.

Electronic Drafters

- Compare logic element configuration on display screen with engineering schematics and calculate figures to convert, redesign, and modify element.
- Consult with engineers to discuss and interpret design concepts, and determine requirements of detailed working drawings.
- Draft detail and assembly drawings of design components, circuitry and printed circuit boards, using computer-assisted equipment or standard drafting techniques and devices.
- Examine electronic schematics and supporting documents to develop, compute, and verify specifications for drafting data, such as configuration of parts, dimensions, and tolerances.
- Key and program specified commands and engineering specifications into computer system to change functions and test final layout.
- Plot electrical test points on layout sheets, and draw schematics for wiring test fixture heads to frames.
- Review work orders and procedural manuals and confer with vendors and design staff to resolve problems and modify designs.

Mechanical Drafters

- Develop detailed design drawings and specifications for mechanical equipment, dies/tools, and controls, using computer-assisted drafting (CAD) equipment.
- Coordinate with and consult other workers to design, lay out, or detail components and systems and to resolve design or other problems.
- Review and analyze specifications, sketches, drawings, ideas, and related data to assess factors affecting component designs and the procedures and instructions to be followed.
- Compute mathematical formulas to develop and design detailed specifications for components or machinery, using computer-assisted drafting programs.
- Position instructions and comments onto drawings.
- Modify and revise designs to correct operating deficiencies or to reduce production problems.
- Design scale or full-size blueprints of specialty items, such as furniture and automobile body or chassis components.

*Detailed descriptions of these occupations may be found in the Occupational Information Network (O*NET) at online.onetcenter.org.*

Important Skills, Knowledge, and Abilities

- Design — Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.
- Computers and Electronics — Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

Electrical, Electronic, and Mechanical Drafters

- Engineering and Technology — (Electronics Drafters) Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.
- Building and Construction — Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.
- Physics — Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub- atomic structures and processes.
- Active Listening — Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.
- Instructing — Teaching others how to do something.
- Technology Design — Generating or adapting equipment and technology to serve user needs.
- Complex Problem Solving — Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- Problem Sensitivity — The ability to tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
- Mathematics — Using mathematics to solve problems.
- Reading Comprehension — Understanding written sentences and paragraphs in work related documents.
- Operations Analysis — Analyzing needs and product requirements to create a design.
- Information Ordering — The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules (e.g., patterns of numbers, letters, words, pictures, mathematical operations).
- Visualization — The ability to imagine how something will look after it is moved around or when its parts are moved or rearranged.
- Near Vision — The ability to see details at close range (within a few feet of the observer).
- Written Comprehension — The ability to read and understand information and ideas presented in writing.

Work Environment

Drafters usually work in well-furnished offices. They mostly work at computer terminals, although some may sit at adjustable drawing boards or drafting tables when doing manual drawings. Drafters often spend long periods of time in front of computers doing detailed work, which can cause eyestrain, back discomfort, and hand and wrist problems. They sometimes are required to travel to construction sites or other locations to gather additional information concerning a particular project that requires more detail.

Most Drafters work a standard 40-hour workweek. Occasionally, long or irregular hours may be necessary to meet special project deadlines.

Electrical, Electronic, and Mechanical Drafters

California's Job Outlook and Wages

The California Outlook and Wage table below represents the occupations across all industries.

Standard Occupational Classification	Estimated Number of Workers 2004	Estimated Number of Workers 2014	Average Annual Openings	2006 Wage Range (per hour)
Electrical and Electronic Drafters				
17-3012	4,900	5,800	230	$19.91 to $32.83
Mechanical Drafters				
17-3013	4,600	5,000	170	$17.54 to $28.92

Wages do not reflect self-employment.
***Average annual openings** include new jobs plus net replacements.*
Source: www.labormarketinfo.edd.ca.gov, Employment Projections by Occupation and OES Employment & Wages by Occupation, Labor Market Information Division, Employment Development Department.

Trends

The projected job growth for Electrical and Electronic Drafters is expected to grow faster than average compared to all occupations between 2004 and 2014. The growth for Mechanical Drafters is expected to grow slower than average between 2004 and 2014. Some need for more Drafters is expected in the computer systems design and services industry sector, as well as temporary help agencies; however, most new job opportunities will come from a need to replace Drafters who retire or leave for other types of work. Opportunities will be best for individuals who have at least two years of post-secondary training in a drafting program, can demonstrate strong technical skills, and who have considerable skill and experience using current CAD systems.

Training/Requirements/Apprenticeships

Employers prefer applicants who have completed training programs in drafting from adult education, community college, private post-secondary, or four-year college training programs. Common program titles used in California are Electrical/Electronics Drafting & Electrical/Electronics CAD; Architectural Drafting and Architectural CAD; Automotive Engineering Technology/Technician; CAD Drafting and/or Design Technology/Technician; and Civil Drafting and Civil Engineering CAD/CADD. Technical training and experience obtained in the armed forces can sometimes be applied toward civilian drafting jobs. Go to the LaborMarketInfo Web site www.labormarketinfo.edd.ca.gov to locate training programs in your area.

Employers are most interested in applicants who have knowledge of drafting standards, mathematics, science, and engineering technology, plus a solid background in computer-aided drafting and design programs such as AutoCAD, Land Development Desktop (LDD), or TurboCAD.

Interpersonal and problem-solving skills are important, as drafters often work closely with engineers, surveyors, architects, other professionals, and sometimes customers. The American Design Drafting Association (ADDA) has established a certification program for drafters. Although drafters are not required to be certified by employers, certification demonstrates the understanding of nationally recognized practices and that knowledge standards have been met. Individuals who wish to become certified must pass the Drafters Certification Test, which is administered periodically at ADDA-authorized test sites.

Electrical, Electronic, and Mechanical Drafters

Recommended High School Course Work
High school students interested in this career should take math, science, computer technology, computer graphics, electronics, and drafting courses.

Where Do I Find the Job?

Direct application to employers remains one of the most effective job search methods.

Use the *Search for Employers by Industry* feature on the *Career Center* page at www.labormarketinfo.edd.ca.gov to locate employers in your area. Search using keywords from the following manufacturing industry names to get a list of private firms and their addresses:

- Architectural Services
- Building Inspection Services
- Computer Systems Design Services
- Custom Computer Programming Services
- Drafting Services
- Electricity & Signal Testing Instruments
- Engineering Services
- Industrial Process Variable Instruments
- Landscape Architectural Services
- Other Surveying and Mapping Services
- Search, Detection, & Navigation Instruments
- Testing Laboratories

Search these **yellow page** headings for listings of private firms:

- Architects
- CAD Systems & Services
- Computer Graphics & Digital Imaging
- Drafting Services
- Engineers-Consulting
- Engineers-Mechanical
- Graphic Designers
- Graphic Services

School placement offices often help students find jobs. Beginning drafters can apply to the personnel departments of large manufacturing, engineering, or contracting firms. Newspapers, professional journals, trade publications, and the Internet may list openings.

Where Can the Job Lead?

Drafters have many opportunities to move upward or into related occupations. Related specialties include engineering technicians, land surveyors, map editors, technical illustrators, tool designers, and cartographers. Each specialty can open opportunities for advancement to a Senior Draftsman level or even Engineering Technician.

Other Sources of Information

American Design Drafting Association
www.adda.org

Accrediting Commission of Career Schools and Colleges of Technology
www.accsct.org

Skills USA
www.skillsusa.org

EDD Employment Development Department State of California
LMID Labor Market Information Division "Your Information Source"